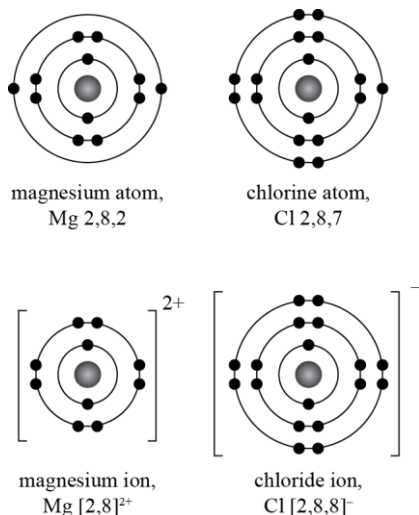


ANSWERS: Electron arrangement

1)



Atoms gain or lose electrons to achieve full valence / outer shells and become more stable. Magnesium has 2 valence / outer shell electrons, so loses two electrons to form the Mg^{2+} ion. Chlorine has 7 valence electrons, so gains one electron to form the Cl^- ion.

2) Fluorine 2, 7

Chlorine 2, 8, 7

F, Cl, Br and I are all in Group 17 of the periodic table. Because F and Cl both have 7 electrons in their valence shell, Br and I will also have 7 valence electrons.

The formation of the calcium ion and chloride ion differ because calcium atoms are metal atoms in Group 2 of the Periodic Table. It has 2 electrons in its valence shell, which it loses to form a calcium ion with a charge of +2. It is +2 because it now has two more positively charged protons than electrons. (Calcium atoms lose electrons to form the same electron configuration as the nearest noble gas (become more stable)).

Whereas chlorine atoms are non-metal atoms in group 17 on the periodic table that gain 1 electron to form the chloride ion. It forms a negative ion with a -1 charge, because it will have one more negatively charged electron than proton. (Chlorine atoms gain electrons to form the same electron configuration as the nearest noble gas (become more stable)).

Note: Candidates are not asked *why* these atoms form ions.

3) Mg is 2,8,2

Al is 2,8,3

S is 2,8,6

(may draw electron arrangements)

Mg is a metal.

S is a non-metal

Magnesium reacts with sulfur to form magnesium ions and sulfide ions.

Magnesium loses (2) electrons to form magnesium ions and sulfur gains (2) electrons to form sulfide ions, resulting in the compound magnesium sulfide.

4) Sodium: 2,8,1

Nitrogen: 2,5

Sodium has only one electron in its outer shell. This electron is lost so as to achieve a stable octet, forming Na^+ . Nitrogen has 5 electrons in its outer shell. It gains 3 electrons to achieve a stable octet / arrangement, forming N^{3-} .

Lithium has one less shell but still has one electron in its outer / valence shell.

Sodium has one more full inner shell but still has one electron in its outer / valence shell